N2-4RC

Low-temperature Thermostat Circulation Water Bath

User’s manual

Hangzhou Bioer Technology Co., Ltd

Note: The document would be subject to modification without further notice.

Without our written consent, any portion of the document shall not be copied, duplicated or translated into other language.

Thank you for your use of our product. Before use of the instrument, please carefully read the instruction. In case of unclear issue, please immediately contact us. We shall provide you our services. Thank you for your cooperation.

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Important

1. Usual practice

Note:

The note item contains extremely important information which should be carefully read; otherwise, the equipment would be damaged or impossible to normally work.

Warning!

The warning information requires careful operation procedures or method; otherwise, damage of equipment or personal injury would occur.

2. Safety

During operation, maintenance and repair of this instrument, the following basic safety measures shall be taken. Failure to take these measures or note the warnings indicated herein would impair the protection, the safety standards of design and manufacture, and even the expected use range of the instrument.

We shall bear no liability to the consequences resulted from user's failure to meet the following requirements.

a) Instrument earth

In order to avoid shock accident, the input power cable of instrument shall be reliably earthed. In this instrument 3-core earth plug is used and this plug has a third (earth) foot and is merely used for earth type power socket. This is a safe unit and also necessary for normal work of the instrument. If the plug is impossible to insert into the socket, a correct socket shall be fixed by electrician so as to prevent the plug from losing safety-protection action.

The supply power shall be reliably earthed.

Caution:

The main protective conductor terminal used for other circuit earthing purposes shall be applied first and secured independently of other connections.Unless servicing involved the protective conductor,it should be reliably earthed.

b) Keeping apart from live circuit

The operator shall not arbitrarily open the instrument and replacement of elements or inside adjustment shall be made by qualified maintenance personnel. The replacement of elements in live-state shall not be allowed.

c) Power supply

Before connecting AC power source, make sure the power voltage consistent with the instrument-required one and the rated load of the power socket not less than the instrument-required load. In order to ensure the safety, the phase of the instrument's power socket shall be consistent with phase of the plug of instrument's power wires. L denotes phase lines, N zero line and E earth line.

d) Power wire

Usually, this instrument uses the accompanied power wire. The damaged power wire, if any, shall be replaced with one of the same type and specification and repair shall not be allowed. During use of this instrument, the power wire shall neither be pressed nor placed in person-passing location.

e) Insertion and withdrawal of power wire

At insertion and withdrawal of power wire, the plug shall be surely held by hands. The plug shall be fully and completely inserted to the socket and at withdrawing of the plug the power wire shall not heavily pulled.

f) Prevention from fire

In order to avoid accident, neither liquid of alcohol concentration over 40% nor mixed solution of low flash point shall be filled in the bath as medium.

The instrument shall be kept apart from air heater, furnace, and other heat or fire source and its surrounding shall not be placed with inflammable or explosive substances.

This instrument has no automatic detection function of gas leakage.

g) Placement of instrument

This instrument shall be fixed in less-dusty place of low humidity and the room shall be well ventilated and free of corrosive gas or strong magnetic field interference. This instrument shall not be fixed in wet or dusty place.

The openings in this instrument are for ventilation to avoid overheat and shall not be blocked or covered. In case of use of a single set of instrument, the distance between its surrounding ventilation holes and the nearest object shall not be below 300mm. Excessively high temperature would impair performances of the instrument or result in trouble. This instrument

shall not be used in the place subjected to direct sunshine or direct radiation of strong light source

The normal working environment for the instrument is room temperature 5～35℃ and RH ＜ 90%,altitude up to 2 000 m.

At shutdown, the power supply shall be switched off. For long-term interruption, the power plug shall be withdrawn and the instrument covered with soft cloth to prevent dust from entrance.

Note: In any of the following cases, please immediately unplug the instrument, contact the supplier or ask qualified maintenance personnel for treatment:

- Liquid drops into the instrument.
- The instrument is rained or watered.
- During running of the instrument, abnormalities occur, especially abnormal sound or odor.
- The instrument is dropped or is casing is damaged.
- Abnormal function of instrument.

Warning signs

WARNING!
Pay special attention to fire prevention while using inflammable solution!
WARNING!
Anti-icing fluid must be used while operating at 0℃ or below 0℃!
ATTENTION!
It is necessary to periodically check the liquid level when the instrument is kept running at high temperature for a long time!
HOT SURFACE!

Warning! In this operation instruction not all issues related with safety at use of our products are involved. Before use of this instrument, the user shall take corresponding safety and health measures and ascertain the applicable range.

h）Maintenance and clean

In case of fuse broken, follow the signs on the model to replace.

If the instruments are dirty, scrub with a clean wash cloth and not cleaned with alcohol and other organic solvents.

i) Excess temperature protection

The excess temperature protection should be set at least 25 °C below the fire point of the bath fluid used.

In the event of wrong setting there is a fire hazard!

We disclaim all liability for damage caused by wrong settings!

3. Other notes

A. Before switching on the power supply, the connection wires between the control system and the water bath shall be checked for being correct and they shall be inserted at correct alignment instead of heavy insertion.

B. In case of trouble during operation, the instrument will automatically stop test. In this case, the instrument shall be turned off to eliminate the trouble before resuming test. In on-state, even after elimination of the trouble, the instrument shall be turned off and then re-started.

C. The instrument temperature shall be calibrated once every year and after replacement of temperature sensor the temperature shall be re-calibrated.

D. At filling of liquid into the bath cares shall be taken to avoid sputtering of liquid into the electric chamber. The liquid level of the medium in the bath shall be at least 2cm from bath cover to prevent liquid inside the bath from sputtering outwards.

E. The liquid level of medium in the bath shall not be excessively low, or the heater would be damaged. Though the bath is provided with low liquid level protection, it shall be frequently checked to avoid too low liquid level.

F. In case of instrument bath temperature is over 50℃, get away from the surfaces of bath frame and cover to avoid being burnt.

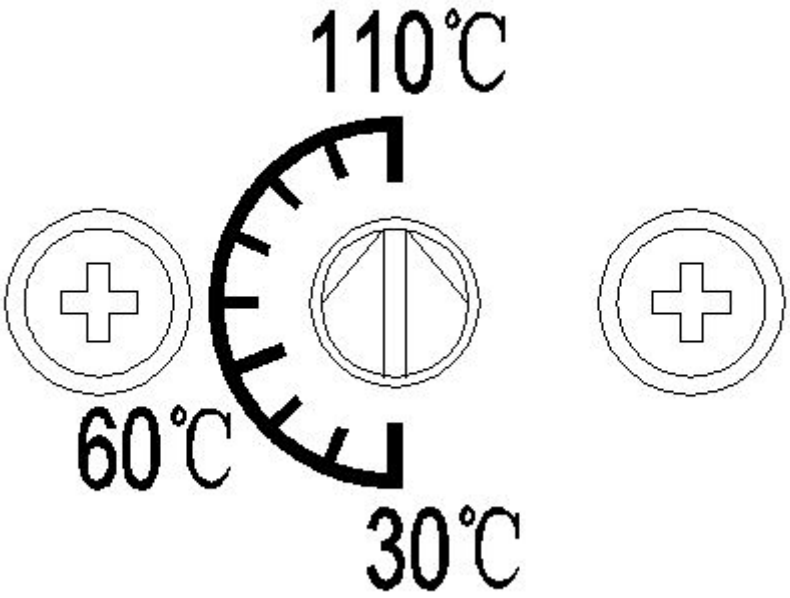
G. At handle of the instrument, the inclination shall not exceed 45°.

H. Recommended bath fluids:

Bath fluid	Temperature range
soft/decalcified water	> 4°C
mixture water/glycol, mixture 1:1	-10°C to 4°C

I. Thermostat Instructions

1. When the working temperature is below 4℃
   a. Use of ethylene glycol and water mixture (ratio 1:1)
   b. Protection set point temperature 30℃(Thermostat to be adjusted)
2. When the working temperature is 4~99.9℃
   a. Use soft water
   b. Protection set point temperature 110℃(Thermostat to be adjusted)



J. During operation ,moving parts must not be accessed in order not to damage the operator.

4. **After-sale services**

For our instruments, the after-sale services are as follows:

a) Warranty contents:

1) In 1 month from the delivery day, we shall be responsible for replacement for the trouble due to defect in materials or workmanship.

2) In 1 year from the acceptance qualification day, we shall render 12 months of integral warranty and also provide all-life maintenance.

b) Warranty range:

1) The damage resulted from user's improper use, use under improper condition, or arbitrary maintenance or reform without authorization shall be excluded in the warranty range.

2) For the repair outside the warranty period, proper cost shall be charged.

c) After-sale services hot line: +86-571-87774558

As per our requirements, some parameters of the instrument would be modified without notice.

Contents

I. Product usage and features. 1

II Basic parameters. 1

III Operation instruction. 2

Low-temperature Thermostat Circulating Water Bath
N2-4RC

A. Preparation. 2

B. Start. 2

C. Setting of parameters. 2

1. Setting of work temperature. 2

2. Setting of safe temperature 3

3. Setting of highest temperature. 3

D. Correction. 4

1. Correction of temperature. 4

E. Control of refrigerating. 4

F. Protection. 4

1. Protection of refrigerator. 4

2. Dry-burning protection. 4

3. Over-current protection. 4

G. Alarm 4

1. Temperature sensor open-circuit alarm 4

2. Temperature sensor short-circuit alarm 4

3. Low liquid level alarm. 5

4. Over-safe temperature alarm. 5

5. Over-highest temperature alarm. 5

[Appendix A] Schematic diagram of control panel. 5

[Appendix B] Structural schematic diagram of instrument. 6

[Appendix C] Electrical schematic diagram of heating circulator. 7

[Appendix D] Electrical schematic diagram of refrigerating system. 8

Low-temperature Thermostat Circulating Water Bath
N2-4RC

I.Product usage and features

This product is a low-temperature thermostat circulation water bath combined with micro computer-controlled thermostat and compressor refrigerating technology, characterized by high temperature control precision, low working noise, rich display interfaces, extra-strong function, easy operation and high safety and reliability, and widely used in fields including petroleum, chemical, medicine, bio-chemical, metering, light industry and scientific research.

- LED module display
- Provided with external-connected PT100 (temperature sensor) interface
- Provided with bath solution outer circulation connection
- Correctable displayed temperature
- Possibly setting safe temperature
- Possibly setting highest water bath temperature
- Function of default setting
- Provided with functions of over-heat alarm, low water level alarm, temperature sensor open-circuit alarm and dry-burning protection.

II. Basic parameters

Model / Parameter	N2-4RC
Temperature control range	(-10～99.9) ℃
Temperature control precision	±0.03 ℃
Heating power	750 W
Nominal power of compressor	135W
Refrigerant	R134a
Temperature raising time	≤ 60 min (Raising from 20℃ to 95℃)
Temperature lowering time	≤ 90 min (Lowering from 20℃ to -10℃)
Input power source	AC220-240V 50Hz
Input power	950 W
Insulation resistance	≥1.5 MΩ
Dielectric strength	Withstanding 50Hz, sine wave AC 1500V for 10 seconds without flashing or breakdown
Dimensions of work area of water bath	150×140×140mm (L× W ×H)
Dimensions of inner tube of water bath	300×150×160mm (L× W ×H)
Outside dimensions	400×230×660mm (L× W ×H)
Size of outer circulation connection	Size of jet port and return port connection: Ø12 ㎜
Net weight	25 kg
Fuse	AC250V 10A(heating unit)
	AC250V 6.3A(refrigeraing unit)

III. Operation instruction

A. Preparation

1. As shown in Appendix B, with power wire connect the controller and thermostat water bath refrigerating system.

As shown in Appendix B, with main power wire connect the thermostat water bath with external power source.

2. Into the bath fill medium till 30mm below its highest position of the bath. (In case of work temperature below 4℃, the medium should be the mixture of water and glycol 【mixture 1:1 】

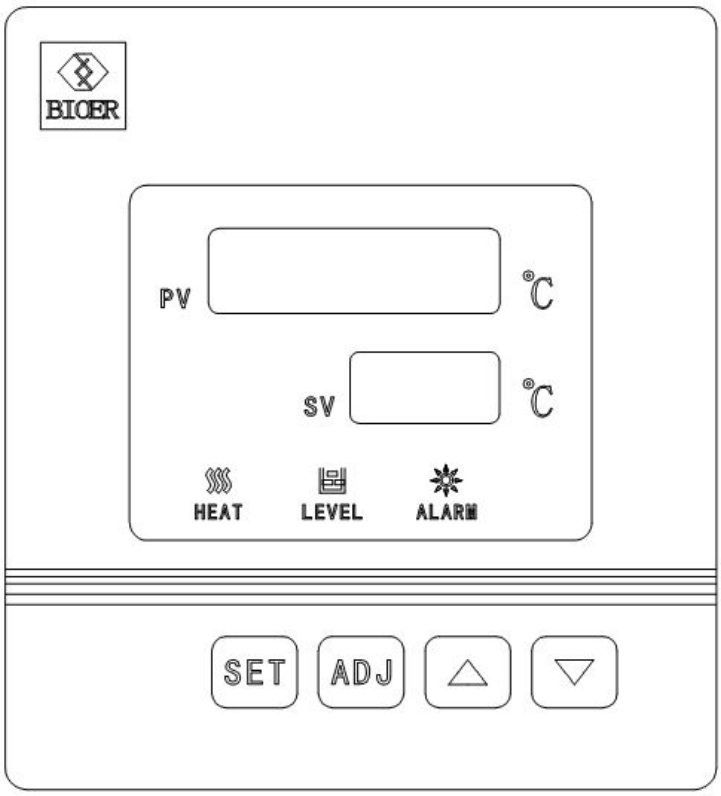
B. Start

1. Switch on the power of the controller and the refrigerator. (If the work temperature is set below room temperature plus 5℃, switch on the refrigerator.).

2. Self-inspection of system: If the system fails in the self-inspection, it will enter the alarm interface. If the system passes the self-inspection, it will enter the work state and run as per the previous-set parameters.

3. The operation interface is shown in Fig. 1.

Fig. 1



C. Setting of parameters

1. Setting of work temperature

In the interface shown in Fig.1, press the SET key to enter work temperature setting state.
At that time, one digit figure in "SV" temperature setting window will flash and the said figure may be adjusted through pressing up/down key.
For adjusting value of other digits, press the SET key again. At that time, the figure in the temperature setting window will shift and the said figure may be adjusted through pressing up/down key.
After 8 seconds from stopping operation, the figure will stop flashing, the system will default the set value and run at the current set value.

2. Setting of safe temperature

(Safe temperature refers to a given temperature limit which is within given range of test temperature and can be set by operator if necessary. In case of abnormality, it will send audio and video alarm).

Example: If the safe temperature is set at 1℃ and the temperature of water bath at 30℃, when the water bath temperature is controlled at 30℃ and the temperature of water bath abnormally varies outside 30℃±1℃, it will send alarm sound and the "Alarm" lamp will light on.

In the interface shown in Fig.1, and simultaneously press key SET and "↑" key for several seconds to enter safe temperature setting state.
At that time, one digit figure in "SV" temperature setting window will flash and the said figure may be adjusted through pressing up/down key.
For adjusting value of other digits, press the SET key again. At that time, the figure in the temperature setting window will shift and the said figure may be adjusted through pressing up/down key.
After 8 seconds from stopping operation, the figure will stop flashing and the system will store the set value.

At ex-work the safe temperature is set at 1℃ and it may be adjusted between 1℃ and 9℃.

3. Setting of highest temperature

(The highest temperature refers to a given temperature which liquid in the water bath shall not exceed and can be set by operator if necessary. In case of exceeding the said temperature, it will send alarm sound and the "Alarm" lamp will light on).

Example: If the highest temperature is set at 80℃ and the temperature of liquid in the water bath exceeds it, it will send alarm sound and the "Alarm" lamp will light on.

In the interface shown in Fig.1, simultaneously press key SET and "↓" key for several seconds to enter the safe temperature setting state.
At that time, one digit figure in "PV" temperature setting window will flash and the said figure may be adjusted through pressing up/down key.
For adjusting value of other digits, press the SET key again. At that time, the figure in the temperature setting window will shift and the said figure may be adjusted through pressing up/down key.
After 8 seconds from stopping operation, the figure will stop flashing and the system will store the set value.

At ex-work the highest temperature is set at 110℃and it may be adjusted between 50℃ and 110℃.

D. Correction

1. Temperature correction

In the interface shown in Fig.1, press ADJ key to enter work temperature correction state.
At that time, one digit figure in "PV" temperature setting window will flash and the said figure may be adjusted through pressing up/down key.
For adjusting value of other digits, press ADJ key again. At that time, the figure in the temperature setting window will shift and the said figure may be adjusted through pressing up/down key.
After 8 seconds from stopping operation, the figure will stop flashing and the system will store the corrected value.

E. Control of refrigerating

If the temperature control point is below environmental temperature plus 5 ℃ the refrigeration switch shall be turned on, when the temperature control point is higher than environmental temperature by 5℃~10℃, the refrigeration switch may not be turned on (had better open the cover of water bath) and when the temperature control point is higher than environmental temperature by at least 10℃ the refrigeration switch shall be turned off.

After cutting off the refrigeration switch, only after at least 3 minutes may the refrigeration switch be re-turned on.

F. Protection

1. Protection of refrigerator

The refrigerator is built with over-pressure protector and over-current protector. In case of over-pressure or over-current in the refrigerator, the refrigerator will stop.

2. Dry-burning protection

The heating tube is fixed with a dry-burning protector and in case of dry-burning it will stop heating.

3. Over-current protection

The power socket of the instrument is fitted with a current fuse and in case of over-current the said fuse will be burnt. At that time, only after the instrument trouble is eliminated and the fuse replaced, may the instrument be re-started

G. Alarm

1. Temperature sensor open-circuit alarm

In case of temperature sensor (PT100) open-circuit, it will make audio and video alarm and stop heating and circulation.

2. Temperature sensor short-circuit alarm

In case of temperature sensor (PT100) short-circuit, it will make audio and video alarm and stop heating and circulation.

3. Low liquid level alarm. If the liquid level is lower than the alarming value, it will alarm and stop heating.

4. Over-safe test temperature alarm

The interface may be set with the safe test temperature. When the bath solution temperature exceeds the said temperature, it will make audio and video alarm.

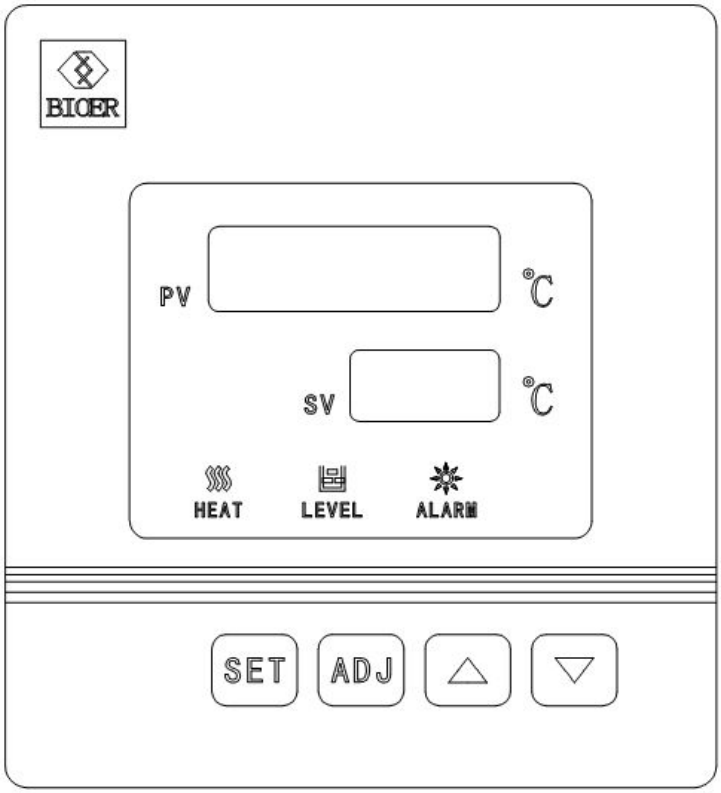
5. Over-highest temperature alarm

Generally, at ex-work the bath solution's highest temperature protection is set and it may also be set by operator.

If the bath solution temperature exceeds the said temperature value, it will make audio and video alarm and stop heating and circulation.

Appendix A

Schematic diagram of control panel



Appendix B

Structural schematic diagram of instrument

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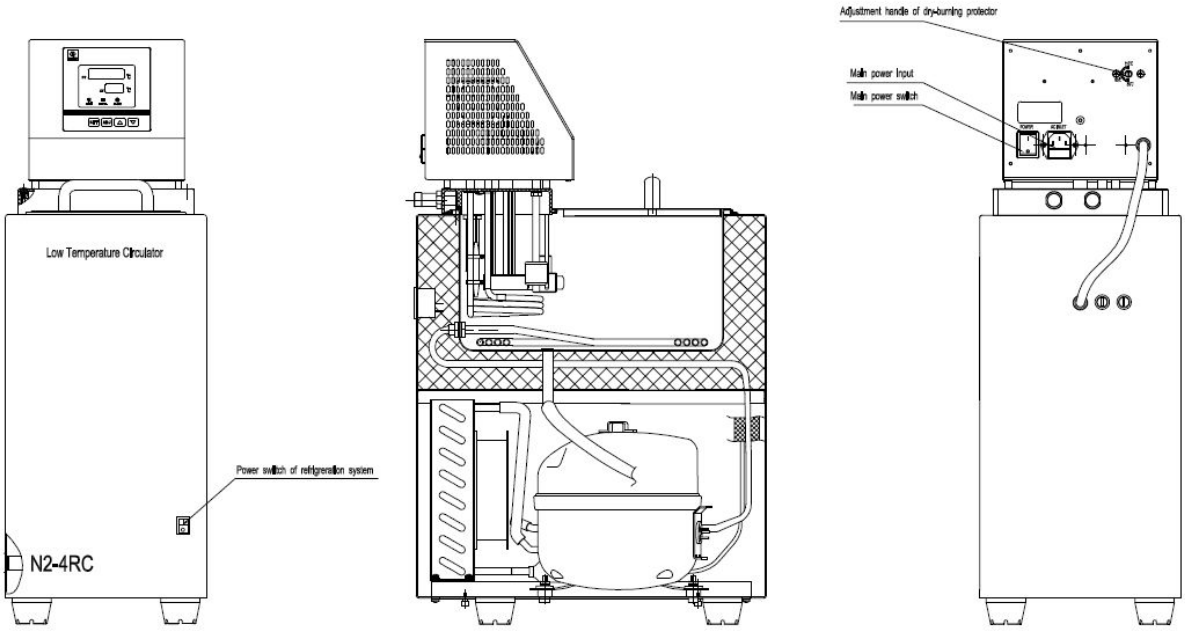
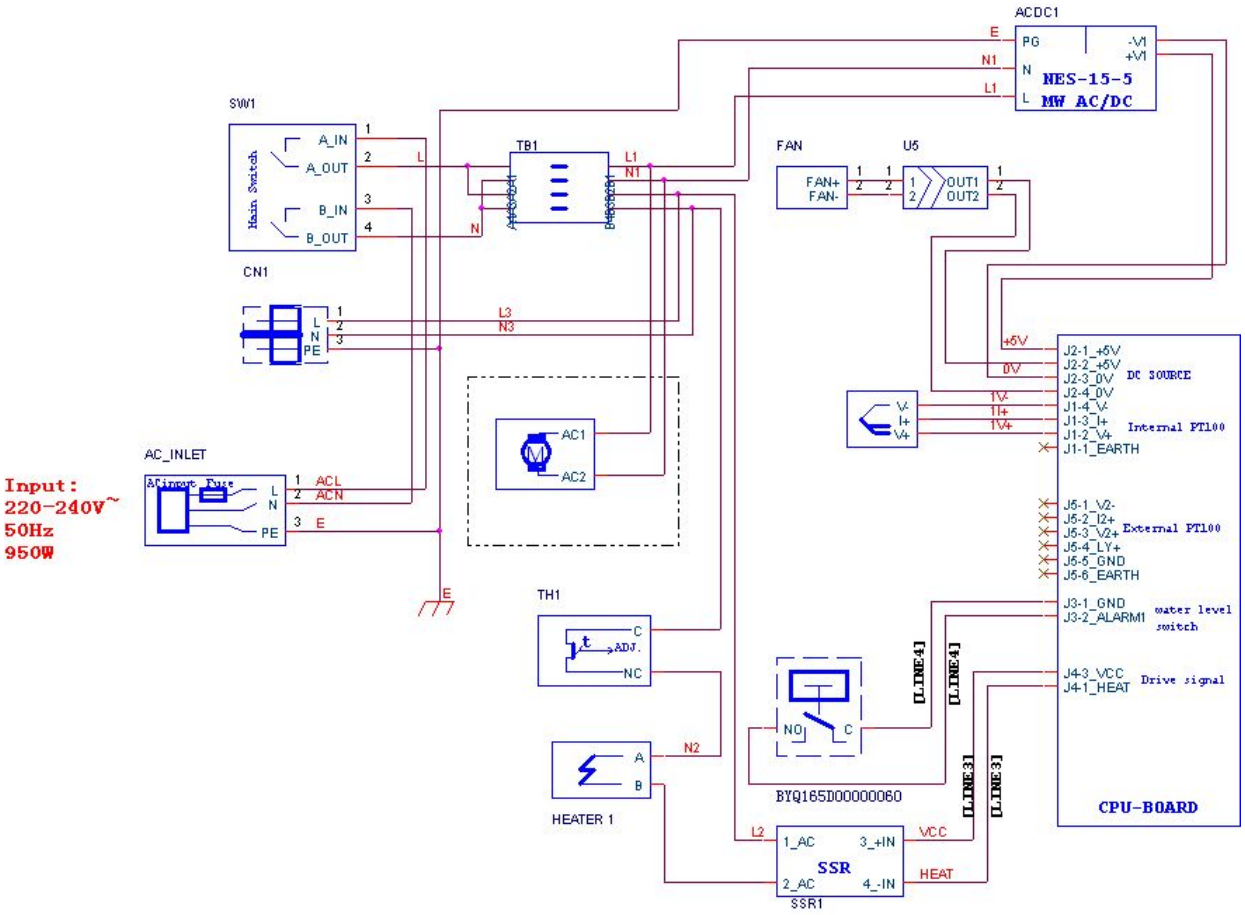


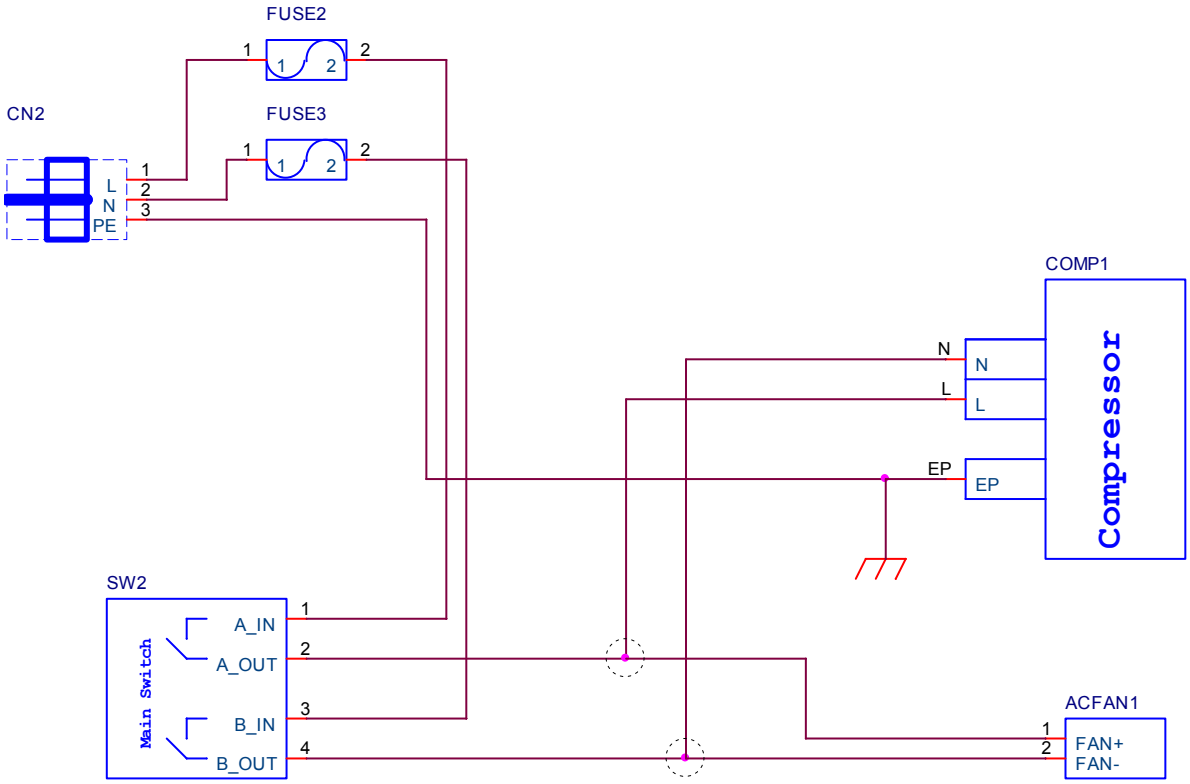
Appendix C

Electrical schematic diagram of heating circulator



Appendix D

Electrical schematic diagram of refrigeration system



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